Comparative Analysis of Mandated Versus Voluntary Administrations of Post-Deployment Health Assessments Among Marines

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ABSTRACT Little empirical data exist regarding candidness of service members' responses on the mandated Post-Deployment Health Reassessment (PDHRA) administered 3 to 6 months postdeployment. This study reports on the agreement between responses from U.S. Marines on a subset of the military-administered mandatory PDHRA items and answers to the same subset of items embedded in confidential research surveys. Results show that personnel are clearly underreporting certain symptoms and conditions on the mandatory PDHRA. The most dramatic increases in reporting on the research study's PDHRA items, as indicated by the percentage ratio, were for self-harming ideation and concern about harming others, each of which has about 14 times the endorsement percentage on the survey as on the official PDHRA. Lack of agreement for some items may be the result of resolution or onset of more acute conditions, but disagreement on sensitive behavioral concerns suggests that mandated PDHRAs are not effective screens for those domains.

INTRODUCTION

Background

Studies from both the United States and other parts of the world have identified significant physical and mental health problems, such as post-traumatic stress disorder (PTSD), associated with military deployments.[1–4] To promote early identification of health problems, especially delayed mental health issues related to deployment stress, and to enhance available services and treatment, the Department of Defense (DoD) conducts official screenings of military personnel returning from deployment at two time points. The first screening occurs immediately at the end of deployment through the Post-Deployment Health Assessment (PDHA). Because some health and adjustment problems may not be present or recognized immediately after deployment and often increase with time,[2,5,6] the second screening occurs again 3 to 6 months later through the Post-Deployment Health Reassessment (PDHRA).

The PDHRA was mandated in 2006. It is mandatory for all active duty, National Guard, and Reserve service members who return from operational deployment. The PDHRA includes the DD Form 2900 Questionnaire and a confidential discussion with a health care provider. The questionnaire evaluates multiple health concerns including depression, interpersonal conflict, PTSD, and alcohol abuse with reported sensitivities on those specified items found to range from 68 to 79% among Soldiers returning from Iraq and based in Europe.[7] It was updated in January 2008 to enhance questions related to behavioral health and add questions on traumatic brain injury. The DoD requires that all service members who report any level of symptoms, questions, or concerns on the DD Form 2900 be interviewed by an independently practicing clinician, such as a physician, physician's assistant, or nurse practitioner. Because the Army and Marine Corps maintain that land combat troops have a higher risk of developing health problems and may also have a culture that discourages seeking care, they have increased the requirement for all members to be interviewed by a clinician regardless of their responses on the DD Form 2900. Results from the PDHRA become a part of the individual's permanent military health record and are included in the Defense Medical Surveillance System.

Literature Review

Because the PDHRA was only recently mandated, few research studies have utilized the data. Several have examined and outlined models for enhancing the PDHRA process within particular services.[8,9] Two longitudinal studies examined the prevalence of mental health disorders, particularly PTSD, and the differences between the rates indicated at the time of the PDHRA compared with the PDHA. Among 88,235 Soldiers returning from Iraq, Milliken et al[10] found that a greater proportion screened positive for PTSD on the PDHRA (17% active duty and 25% Reserve Component) than on the PDHA (12% active duty and 13% Reserve Component). The proportion screening positive for depression doubled among active duty personnel (from 5 to 10%) and tripled among members of the Reserve Component (from 4 to 13%). A second study found that only 30% of military personnel who screened positive for PTSD on the PDHRA had also screened positive on the PDHA.[11]

Fass[12] compared the rates of mental health concerns, alcohol use, and associated problems between military personnel in Milliken et al[10] and college students completing the same PHDRA mental health and alcohol screens. College students

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reported higher rates of PTSD and depression and significantly higher rates of interpersonal conflict, suicidal ideation, interpersonal aggressive ideation, and alcohol misuse compared with active duty Iraq veterans. College students reported similar rates of PTSD, depression, interpersonal conflict, and alcohol misuse and significantly higher rates of suicidal ideation and interpersonally aggressive ideation when compared with Reserve and National Guard Iraq veterans. The author suggests these findings highlight potential problems associated with postdeployment mental health screening and the possible underestimation of mental health concerns of military personnel.

Concern is thus warranted regarding how forthright service personnel are being in their responses to the PDHRA, particularly if they fear their responses on this form and stigma associated with accessing mental health could affect their military career.[2] This concern is buttressed by a study comparing diagnosed mental health disorders with responses on the Pre-Deployment Health Assessment, which showed that less than half of subjects with a mental health diagnosis reported seeking counseling or care for their mental health.[13]

Purpose

The purpose of the present study is to examine the degree of agreement between responses on the mandated PDHRA and responses on a volunteer research-based PDHRA. The primary hypothesis that this study seeks to test is that Marines are underreporting conditions and concerns on the military-administered PDHRA. The aim is to compare responses on a subset of the military-administered PDHRA items and responses to that same subset of items contained in data collected as part of two health-related research surveys of Marine Corps personnel attending mandatory transition assistance classes.

METHODS

Data Sources

All data for the military PDHRA administrations were obtained from a DoD database developed and maintained at the Naval Health Research Center (NHRC) in San Diego, California. The database, the Career History Archival Medical and Personnel System, contains detailed epidemiological data from official medical and personnel records for more than six million members of the military services and is the largest known epidemiological database in the United States.[14]

The research-based PDHRA data came from the nationwide Health of Transitioning Marines Survey administered by Research Triangle Institute International in conjunction with NHRC. The 30- to 45-minute paper-and-pencil survey was administered on-site during routine-mandated Transition Assistance Program (TAP) classes in two periods, between September through December 2007 and late January through April 2009. TAP classes are mandated for all Marines within 2 years of discharge from the military. Additional information

TABLE I. Percent Frequencies, Prevalence, and Underreporting Statistics (N = 355)

Item	Number Missing		Endorsement Frequencies		Prevalence (%)			Underreporting (%)
	Mandated PDHRA	Survey	Mandated PDHRA	Survey	Mandated PDHRA	Survey	Ratio	
Chronic Cough	0	0	4	25	1.13	7.04	6.25	7.12
Fever	0	0	0	4	0.00	1.13	—	1.13
Weakness	0	0	21	33	5.92	9.30	1.57	6.29
Headaches	0	0	48	105	13.52	29.58	2.19	21.82
Swollen/Stiff/Painful Joints	0	0	66	148	18.59	41.69	2.24	38.06
Back Pain	0	0	90	216	25.35	60.85	2.40	49.81
Muscle Aches	0	0	40	136	11.27	38.31	3.40	34.60
Numbness/Tingling Hands/Feet	0	0	26	76	7.32	21.41	2.92	17.63
Skin Diseases or Rashes	0	0	19	36	5.35	10.14	1.89	7.74
Ringing in the Ears	0	0	62	133	17.46	37.46	2.15	31.06
Redness of Eyes w/ Tearing	0	0	12	23	3.38	6.48	1.92	5.25
Dimming of Vision	0	0	8	16	2.25	4.51	2.00	4.32
Chest Pain or Pressure	0	0	19	49	5.35	13.80	2.58	9.82
Dizziness/Fainting/Light Headedness	0	0	11	33	3.10	9.30	3.00	8.14
Difficulty Breathing/Shortness	0	0	12	30	3.38	8.45	2.50	7.29
Diarrhea/Vomiting/Indigestion	0	0	14	28	3.94	7.89	2.00	4.99
Problems Sleeping/Tired	0	0	73	172	20.56	48.45	2.36	39.72
Difficulty Remembering	0	0	55	117	15.49	32.96	2.13	22.67
Increased Irritability	0	0	60	130	16.90	36.62	2.17	27.12
Risk Taking (e.g., Driving Fast)	0	0	13	43	3.66	12.11	3.31	10.53
Self-Harming Ideation[a]	5	2	1	15	0.56	8.24	14.75	7.39
Might Hurt/Lose Control w/ Other	15	79	8	87	2.35	31.52	13.40	30.74

[a]Comparison data for this item was only available on our first survey administration, thus the total N for this item was 184.

TABLE II. Cross-Tabulation Frequencies and Agreement Statistics With 95% CIs

Name	NN	NY	YN	YY	Percent Positive Agreement (%)	Percent Positive Agreement CI (%)	Percent Negative Agreement (%)	Percent Negative Agreement CI (%)
Chronic Cough	326	25	4	0	0	0–0	96	94–97
Fever	351	4	0	0	0	0–0	99	99–100
Weakness	313	21	9	12	44	28–61	95	94–97
Headaches	240	67	10	38	50	40–59	86	83–89
Swollen/Staff/Painful Joints	179	110	28	38	36	27–44	72	68–77
Back Pain	133	132	6	84	55	48–62	66	60–71
Muscle Aches	206	109	13	27	31	22–40	77	73–81
Numbness/Tingling Hands/Feet	271	58	8	18	35	23–47	89	87–92
Skin Diseases or Rashes	310	26	9	10	36	20–53	95	93–96
Ringing in the Ears	202	91	20	42	43	34–52	78	75–82
Redness of Eyes w/Tearing	325	18	7	5	29	9–48	96	95–98
Dimming of Vision	332	15	7	1	8	7–24	97	95–98
Chest Pain or Pressure	303	33	3	16	47	32–62	94	93–96
Dizziness/Fainting/Light Headedness	316	28	6	5	23	6–39	95	93–97
Difficulty Breathing/Shortness	318	25	7	5	24	7–41	95	94–97
Diarrhea/Vomiting/Indigestion	324	17	3	11	52	34–71	97	96–98
Problems Sleeping/Tired	170	112	13	60	49	41–57	73	69–78
Difficulty Remembering	232	68	6	49	57	48–66	86	83–89
Increased Irritability	215	80	10	50	53	44–61	83	79–86
Risk Taking, e.g., Driving Fast	306	36	6	7	25	10–40	94	92–96
Self-Harming Ideation	163	13	1	0	0	0–0	96	94–98
Might Hurt/Lose Control w/Other	178	79	2	6	13	4–22	81	77–85

about the research study is available in Mansfield et al[15] and Hourani et al.[16]

The PDHRA items examined were the checklist of current conditions and concerns and items of concern about past month thoughts of hurting oneself or others that were replicated between the mandated form and research survey. Because of DoD policy changes, two different PDHRA forms (2005 and 2008 versions) were administered by the military during different periods to the sample in our study, and specific items are listed in Tables I and II.

Administration order varied between the military PDHRA administration and the research survey. Thirty-six percent of the sample had the research survey administration first and 64% had the military-administered PDHRA first. The average lag time difference in days between the military PDHRA administration and the administration of these items on our survey, regardless of which was first, was 47.1 days (SD 25.4). Thirty-two percent of the sample had the two administrations within 30 days of each other, and 64% had them within 60 days of each other.

Sample

All TAP class participants from classes conducted during the data collection period were invited to participate in the study. Classes included those conducted at six randomly sampled Marine bases across three strata defined by base size. Of the 3,770 participating Marines, only those with corresponding data for a "mandated" administration within 90 days of the research survey date were included in the present study. Our selection process resulted in a total of 355 cases for comparison: 184 cases from 2007 and 171 cases from 2009. If more than one military administration occurred within 90 days, the one closest to the date of the research survey administration was used. We compared the subsample used in this analysis to the full sample of research participants on a number of demographic variables (Table III) and found it was fairly representative of the Marines in the two periods of our study. Demographic differences between the Marine PDHRA subsample and our study's Marine participants were small. Most differences probably arose because the full transition survey sample included retirees who were less likely to have recently returned from a deployment and therefore would not have had a military-administered PDHRA within 90 days of the research survey.

Statistical Analyses

Several descriptive statistics were calculated for this study. First, the raw counts were calculated for individuals endorsing each item for both the DoD PDHRA and our survey sources. These frequencies were also transformed into the percentage (prevalence) that each of these counts represented. To compare the results from the two surveys, two statistics were calculated. First, the ratio of the two percentages (survey prevalence divided by mandated PDHRA prevalence) provided one gauge of the reporting differences. This was included because sometimes a small percentage difference still represents a large percentage increase for rarely reported events. We also included the underreporting percentage, which in this case is the percentage of those who did not endorse an item on the military PDHRA but did endorse the item on our survey,

TABLE III. Sample Demographics Comparing Current Sample to Full Transition Survey Sample

	Full Transition Survey Sample No. (%)	Current PDHRA Sample No. (%)
Age Categories	3,770	355
25 or Younger	2,701 (71.6)	267 (75.9)
26–34	748 (19.9)	68 (19.3)
35 or Older	321 (8.5)	17 (4.8)
Gender	4,271	355
Male	3,937 (92.2)	341 (96.6)
Female	334 (7.8)	12 (3.4)
Race/Ethnicity	4,259	355
White, Non-Hispanic	2,914 (68.4)	256 (72.5)
African-American, Non-Hispanic	338 (8.0)	20 (5.7)
Hispanic	746 (17.5)	62 (17.6)
Other	261 (6.1)	15 (4.3)
Enlisted/Officer	4,281	355
E1–E9, W1–W5	4,125 (96.4)	346 (97.5)
O1–O6	156 (3.6)	9 (2.5)
Presence of Anxiety	4,258	355
No	2,846 (66.8)	228 (64.6)
Yes	1,412 (33.2)	125 (35.4)
Combat Exposure (Mean Score)	9.82	10.05
PTSD (Mean Score)	38.14	39.27
Depression Score (Mean Score)	18.02	18.13

providing information on the rate of potential new positive cases for each item on our survey.

To examine whether there was any effect on agreement by the order of administration, we divided the sample into those who had the mandated PDHRA first and those who had the survey items first and reran the analyses. The same patterns of finding higher prevalence in the survey administration than in the mandated PDHRA were observed, confirming that our results were not affected by the order of administration.

In addition to the descriptive statistics reporting actual prevalence rates, we also calculated agreement statistics to assess reporting departures between the mandated PDHRA and the volunteer research-based survey results. Two agreement measures, percent positive and percent negative agreement, were estimated along with their respective confidence intervals (CIs). We calculated their CIs using the delta method (http://www.john-uebersax.com/stat/icc.htm[17]; http://www.john-uebersax.com/stat/raw.html[18]; http://www.john-uebersax.com/stat/sp_sas/txt[19]).

The most commonly reported summary agreement statistics include the kappa coefficient and intraclass correlation (ICC). However, because the prevalence rates in these data were far from a 50/50% endorsement/nonendorsement rate split and the marginal distributions of the two administrations do not closely match, the kappa statistic could yield paradoxical results and its use is not advised.[16,20,21] The ICC[22] also suffers from problems with comparability when base rates differ in the populations being compared.[23] Instead, we report two statistics that do not suffer from these weaknesses: percent positive and percent negative agreement. Percent positive agreement is the number endorsing an item on both administrations divided by an average number endorsing the item on either administration. Percent negative agreement was calculated similarly with nonendorsement responses. For example, 216 Marines report back pain on the research survey (see Table II, columns NY and YY, 132 + 84 = 216) and 90 Marines report this on the PDHRA (columns YN and YY, 6 + 84 = 90). Eighty-four report back pain on both. On average, (216 + 90)/2 = 153 Marines report back pain on either source. Thus, 84/153 = 55% is the percent positive agreement for the back pain item.

RESULTS

Descriptive Statistics

Table I provides basic comparative statistics between the mandated and voluntary research-based PDHRA responses. The number missing out of the 355 cases in our sample for each item was only notable for the slightly larger numbers of respondents (22% on research administration and 4% on PDHRA) who chose to not respond to the concern about hurting others item. Because of changes in the survey, the self-harming ideation item was only included in our first survey administration, thus it is only available for about half the data.

It is clear that in every case the endorsement rates were higher in our study data than in the military's data. Prevalence rates in both administrations were highest for headaches, joint pain, back pain, muscle aches, ringing in the ears, sleep problems, memory difficulties, irritability, and concern about losing control and hurting another (survey only). Generally, prevalence rates on the survey were at least twice those found on the official DoD PDHRA (see "Ratio" column, Table I). The most dramatic increases in reporting on the study's PDHRA items, as indicated by the percentage ratio, were for self-harming ideation and concern about

harming others, each of which has about 14 times the endorsement percentage on the survey as on the official PDHRA. Other items with high ratios include cough, muscle aches, numbness, chest pain, dizziness, difficulty breathing, and risk-taking items.

As expected, we found the high underreporting rates for virtually all the items that had a high ratio of endorsement percentages. The items with the highest underreporting rates were back pain, sleep problems, joint problems, muscle aches, concern about losing control with or without harming others, and ringing in the ears.

Agreement Statistics

Table II provides the results for the agreement statistics, beginning with four columns presenting the two-way cross-tabulation frequencies (labeled NN, NY, YN, and YY). The two-letter column labels refer to the two PDHRA item administrations being compared with the military PDHRA response designated by the first letter and the response to the research study with the second letter. "Y" indicates that the item was endorsed, and "N" indicates that it was not endorsed. Percent positive agreement, also found in Table I, was fairly low across the entire set of items. Items with the lowest percentages of positive agreement were chronic cough, fever, dimming of vision, dizziness, difficulty breathing, risk taking, self-harming ideation, and concern about losing control with or harming others. Percent positive agreement CIs for most of these items overlap zero and are thus not statistically significantly different from zero, i.e., no agreement. Others while not overlapping zero have upper confidence limits at or about 0.40 at the highest indicating that agreement occurs less than half the time. Items with the lowest percentages of negative agreement were joint problems, back pain, muscle aches, ringing in the ears, sleep problems, irritability, and concern about losing control and harming others. Percent negative agreement was generally high across most of the items because of the large numbers of Marines who do not endorse these items on either the DoD PDHRA or our survey. Lower values for this statistic occurred for items with higher endorsement rates across at least one of the two administrations.

DISCUSSION

Results support the hypothesis that for the subset of items examined, military personnel are clearly underreporting certain symptoms and conditions on the PDHRA. Whether one is looking at differences in prevalence rates or agreement statistics, a core set of items shows up repeatedly as showing very low agreement. Admittedly these are not independent measures, but they are different ways of assessing the question of agreement, and they tend toward the same conclusion on any given item. Chronic cough, back pain, muscle aches, numbness of hands and/or feet, dizziness, breathing difficulty, sleep problems, memory problems, irritability, risk taking, self-harming ideation, and concern about harming others or losing control items all show poor endorsement agreement with considerably higher endorsement on the volunteer research study than on the mandated PDHRA.

Although this study identifies underreporting on the PDHRA, it is unable to attribute a casual explanation. Lack of agreement may be the result of resolution or onset of more acute conditions, but disagreement on sensitive, more chronic mental health conditions, such as sleeping problems, irritability, risk taking, and hurting oneself or others, suggests a reluctance to admit such problems on the military-mandated forms. In turn, this suggests that personnel are reluctant to endorse items that may indicate underlying mental health concerns. It should also be noted that even adequate sensitivity and specificity of a screening instrument will be much less meaningful if those completing the instrument are not entirely truthful.

Several study limitations should be noted. Although the data for this study were not representative of all deployed Marines, they were quite representative of the Marines in our full survey sample, which included a representative sample of Marines most of whom were about to be discharged from the military and had been deployed during their military careers. Although it is possible that some of the health items on the data collection instruments had been resolved in the time between administrations, the lag time between the military PDHRA and our survey administrations was only 47 days on average. This lag period was not considered long enough to explain all differences as being solely due to the passage of time, especially considering those pertaining to chronic and mental health conditions, nor did the order of administration of survey versus mandated PDHRA appear to have an influence. Indeed, results suggest that mandated PDHRAs may not be effective screens for many conditions and may elicit untruthfulness among respondents.

These results together with the finding from the Government Accounting Office that PDHRAs have been missing from DoD's central repository,[24] the questionable effectiveness of the PDHRA screening, especially for Soldiers with alcohol problems[10] and mental health problems noted in the literature,[25] the inadequacy of the related PDHA in assessing combat experiences,[26] and the low percentage of referrals noted in response to personnel with PDHRA-identified mental health risks,[27] raise doubts about DoD's ability to assess risk factors and address health concerns that could emerge over time following deployment. Not only may unidentified and/or unresolved health issues become worse in time and have serious consequences for the health status of the veteran and his family but may also negatively impact subsequent military and civilian health service delivery systems. These results point to the importance of not only continuing research for developing enhanced military health screening measures but the need for continuing programmatic efforts to reduce the stigma particularly of self-identifying potential mental health problems and ensuring

access to health service providers. The possibility of mandating individual screening for all personnel returning from deployment could also be considered.

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14. ABSTRACT

Little empirical data exists regarding candidness of service members' responses on the mandated Postdeployment Health Risk Assessment (PDHRA) administered 3-6 months post-deployment. This study reports on the agreement between responses from US Marines on a subset of the military-administered mandatory PDHRA items and answers to the same subset of items embedded in confidential research surveys. Results show that personnel are clearly underreporting certain symptoms and conditions on the mandatory PDHRA. The most dramatic increases in reporting on the research study's PDHRA items, as indicated by the percentage ratio, were for self-harming ideation and concern about harming others, each of which has about 14 times the endorsement percentage on the survey as on the official PDHRA. Lack of agreement for some items may be the result of resolution or onset of more acute conditions, but disagreement on sensitive behavioral concerns suggests that mandated PDHRAs are not effective screens for those domains.

15. SUBJECT TERMS
Military, mental health, attrition, retention

16. SECURITY CLASSIFICATION OF:			**17. LIMITATION OF ABSTRACT**	**18. NUMBER OF PAGES**	**18a. NAME OF RESPONSIBLE PERSON**
a. REPORT	**b. ABSTRACT**	**c. THIS PAGE**			Commanding Officer
UNCL	UNCL	UNCL	UNCL	6	**18b. TELEPHONE NUMBER (INCLUDING AREA CODE)** COMM/DSN: (619) 553-8429